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COAST GUARD

Oil Spills Continue Despite Waterfront Facility Inspection Program



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The Honorable Walter B. Jones
Chairman, Committee on Merchant
Marine and Fisheries
House of Representatives

The Honorable Robert W. Davis
Ranking Minority Member
Committee on Merchant Marine
and Fisheries
House of Representatives

The Honorable W. J. (Billy) Tauzin
Chairman, Subcommittee on Coast Guard
and Navigation
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According to the most recently published data, about 16,000 oil spills occurred during 1988 in the navigable waters of the United States. These spills accounted for more than 46 million gallons of oil released—over four times as much as poured from the Exxon Valdez into Alaska's Prince William Sound in March 1989. Spills at waterfront facilities, where vessels load or unload their oil, generally account for about half of the oil spilled. These spills represent a major threat to marine animal and plant life.

You asked us to examine federal efforts to protect the marine environment from petroleum pollution caused by oil spills from pipelines and waterfront facilities. As agreed with your offices, we discussed the problem of inter- and intrastate pipelines in our January 1991 report, which concluded that there should be a pollution prevention program for such pipelines and that spill response was hindered by a lack of information on the locations and operators of pipelines.¹ This report on waterfront facilities discusses (1) whether the Coast Guard's responsibility for regulating and inspecting waterfront facilities is adequately defined and (2) whether the Coast Guard's inspection program for waterfront facilities is reducing the risk of oil spills.

¹Pollution From Pipelines: DOT Lacks Prevention Program and Information for Timely Response (GAO/RCED-91-60, Jan. 28, 1991).

Results in Brief

The responsibility of the Coast Guard to regulate and inspect waterfront facilities, including transportation-related intrafacility pipelines, is adequately defined. Although the Coast Guard acknowledges this responsibility, it is not carrying out all of its assigned duties. The Coast Guard has implemented a regulation and inspection program at waterfront facilities. However, its field inspectors believe a 1971 memorandum of understanding between the Department of Transportation (DOT) and the Environmental Protection Agency (EPA) does not clearly assign specific responsibility for the sometimes complex system of intrafacility pipes that transport oil between dockside and storage areas ashore. Accordingly, the Coast Guard inspects pipelines up to the first valve ashore, but not between the first valve ashore and the storage tank areas. The memorandum of understanding clearly states that these pipelines are not the responsibility of EPA. Therefore, EPA is not inspecting them either. Consequently, these pipes, which pose considerable pollution risks, are not inspected by a federal agency.

Water pollution and noncompliance with federal oil pollution prevention regulations continue to be high at waterfront facilities. According to Coast Guard officials, the objective of the waterfront facility inspection program is to ensure compliance with the Coast Guard's pollution prevention regulations and thereby reduce the frequency and severity of oil spills. The impact of the Coast Guard's inspection efforts on reducing the risk of oil spills, however, is unknown: Information, such as the frequency and severity of deficiencies identified and the types of regulatory noncompliance causing oil spills, needed to evaluate the impact of Coast Guard efforts, is not compiled. Such information would also be useful in setting operational goals for the inspection program and targeting inspection resources on areas of greatest pollution risk. This information is not being collected because the Coast Guard has focused on completing annual inspections rather than on establishing a process to evaluate the effectiveness of its inspection efforts.

Background

A waterfront facility consists of docks where vessels moor to receive or discharge their oil cargo and a system of pipes and valves that transport the oil between the dock and other areas of a petroleum facility, such as storage tanks. Generally, a waterfront facility is a small portion of a larger petroleum facility that processes or distributes petroleum products. There are approximately 4,130 waterfront facilities in the United States.

The Water Quality Improvement Act of 1970 (P.L. 91-224) gave the President authority to prevent water pollution from oil.² The President delegated authority for preventing water pollution from facilities involved in transportation, such as oil-loading docks for vessels, to DOT and from nontransportation facilities, such as oil storage tanks, to EPA.³ The Secretary of Transportation, in turn, delegated the Department's responsibility to the Coast Guard. For those petroleum facilities that receive or ship oil by vessel, EPA shares authority for water pollution prevention with the Coast Guard, as defined in a 1971 memorandum of understanding.

The Coast Guard, having responsibility to regulate transportation aspects of a facility, established standards for equipment used by operators, such as the required minimum strength of pipes and hoses used to transfer oil. It also established operating procedures; for example, one operating requirement is that a qualified facility employee supervise the transfer of petroleum between the facility and the vessel.

In addition, the Coast Guard annually inspects waterfront facilities to ensure that operators comply with its pollution prevention regulations. Inspectors working out of Coast Guard offices in 48 ports used about 3,350 staff days for inspections during 1990. During an inspection, Coast Guard inspectors use checklists to verify, among other things, that operations manuals are complete and current, that records of required equipment testing are up-to-date, and that an emergency shut-down device is in place. If an oil transfer between a vessel and the facility is under way, inspectors use additional checklists to verify that operating practices comply with regulations—for instance, that qualified personnel are present, that the vessel has been properly moored to the dock, and that the oil transfer hoses between the dock and the vessel are properly supported. Deficiencies, if any, are listed in an inspection report, which is given to the facility manager after each inspection. According to Coast Guard officials, problems must be corrected by a date specified by the local commander and may be verified by a follow-up inspection. If the deficiency is considered very serious, inspectors may order an immediate cessation of oil transfers. Monetary penalties for each violation can also be assessed.

²The Federal Water Pollution Control Act Amendments of 1972, as amended, popularly referred to as the Clean Water Act, contained similar provisions as the Water Quality Improvement Act and superceded it (33 U.S.C. 1251-1376).

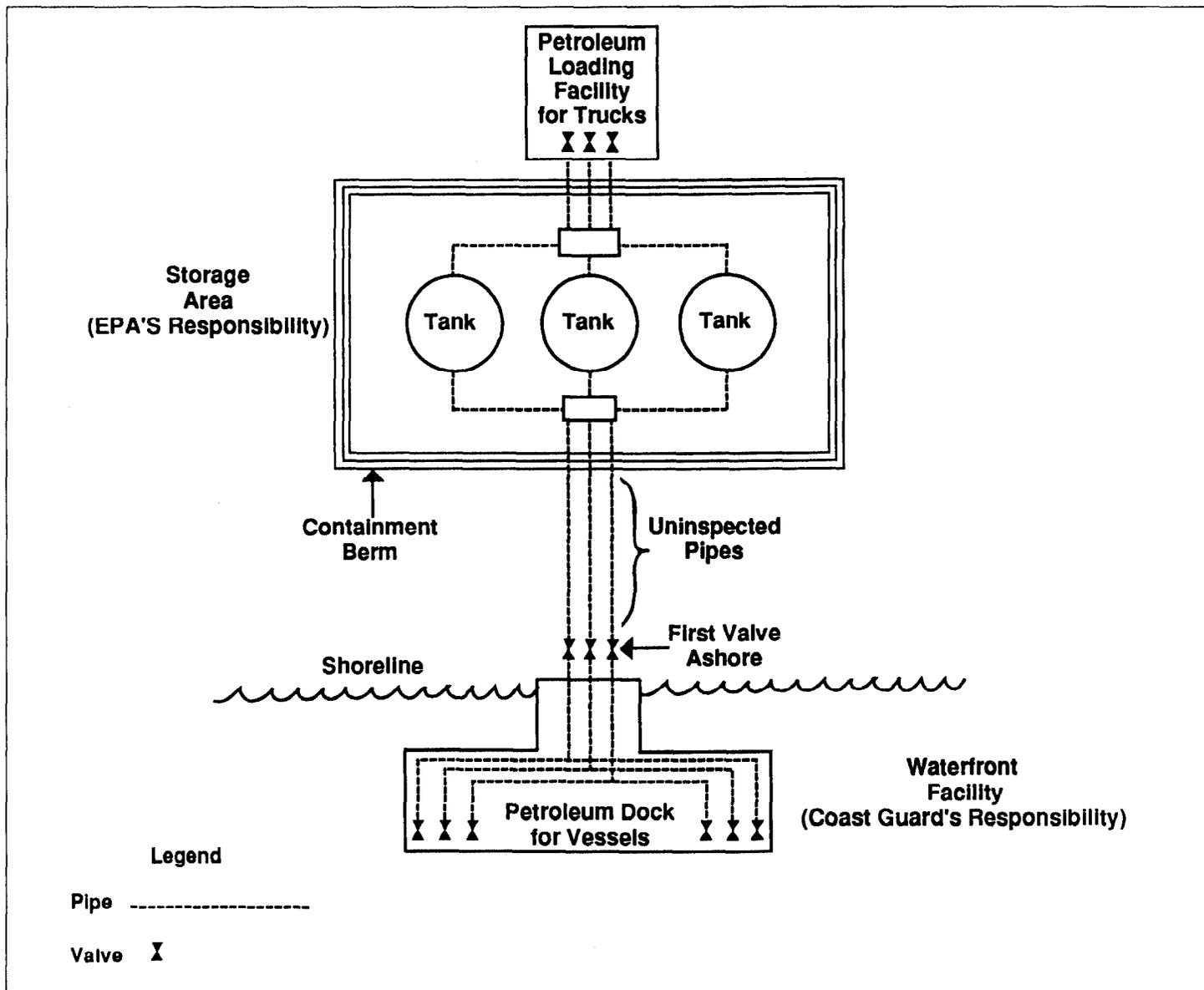
³In a report entitled Inland Oil Spills: Stronger Regulation and Enforcement Needed to Avoid Future Incidents (GAO/RCED-89-65, Feb. 22, 1989), GAO evaluated the EPA program for regulating and inspecting oil storage facilities and made recommendations for improvement.

Although Its Responsibility Is Defined, Coast Guard Does Not Inspect All Transportation-Related Pipes

According to the 1971 memorandum of understanding (see app. I for excerpts), the agency responsible for overseeing pipes is determined by whether the pipes are transportation- or nontransportation-related. The memorandum states, and Coast Guard headquarters officials agreed, that when intrafacility pipeline systems are primarily used to transport oil to or from vessels, they are the responsibility of the Coast Guard. In addition, the memorandum specifically states that these pipeline systems are not the responsibility of EPA.

According to Coast Guard field inspectors, however, pipelines within a waterfront facility are a continuous system, and some can be used to transfer oil between storage tanks—which, being nontransportation-related, are the responsibility of EPA. However, the primary purpose of the pipes that move oil between the first valve ashore and storage tank areas is transportation. In these circumstances both Coast Guard headquarters officials and the memorandum of understanding classify these pipes as subject to inspection by the Coast Guard. As such, the Coast Guard should inspect these pipes. Notwithstanding this, most of the Coast Guard's pipe inspections do not extend beyond the first valve ashore. Thus, no federal inspection is made of pipes between the first valve ashore and the storage tank areas. Figure 1 is a diagram of a simplified petroleum facility that has both transportation and nontransportation aspects.

Figure 1: Petroleum Facility



Note: Number of docks, tanks, and pipes, and the length of pipes vary by facility.

We randomly selected 12 of 55 petroleum complexes in Philadelphia and 11 of 167 complexes in New York to determine the risk of water pollution posed by intrafacility pipes not inspected by a federal agency. Pipes at 17 of the 23 facilities we examined had not been inspected. We found that uninspected pipes numbered from 1 to 25 and were from 300 feet to

4 miles long and from 8 to 36 inches in diameter. (See app. II for more detail on pipes in Philadelphia.) If Coast Guard oversight were extended to them, these pipes would have to be inspected annually to ensure that they meet current Coast Guard regulatory standards, which require that pipes be tested to ensure that they do not leak under static liquid pressure of 1-1/2 times the maximum allowable working pressure.

In addition, according to our consultant who reviewed these and additional data,⁴ such as facility maps and diagrams of these piping systems, generally pipes such as these pose a significant pollution risk because (1) most are more than 10 years old and some are buried, (2) oil is transferred under pressure, and (3) most are close to the water. Older buried pipes are particularly vulnerable because technology to adequately protect them from corrosion has been developed only within the last 10 years. Furthermore, pressurized pipes may be weakened by the cycles of pressurization, and pipe failures can result in relatively large spills. For the pipes we examined, up to 56,700 gallons of oil could spill in the 3 minutes it would take to reach the shut-down valve.⁵ Finally, short distances to the water allow little time for emergency workers to intervene, especially since most facilities are on terrain sloping toward the water.

In addition to the risk of pollution, two recent spills demonstrate what can actually happen when uninspected pipes between the dock and storage areas break while transferring oil under pressure.

- A spill occurred in Philadelphia in January 1990 during a transfer of crude oil from a tank vessel to a tank farm about one-quarter mile inland. A 30-inch underground pipe burst 25 feet inland from the shoreline, saturating the surrounding soil. The total amount of oil spilled was not reported, but an estimated 250 gallons of oil eventually leaked into the Delaware River from the saturated soil.
- A spill occurred in Tacoma, Washington, in January 1991 when a 16-inch uninspected underground pipe ruptured while transferring crude oil from a ship to a tank farm about a mile away. The resulting 600,000-gallon spill was one of the largest in the state's history. According to an EPA estimate, 1,500 to 3,000 gallons leaked into a tributary leading to Puget Sound.

⁴Engineering Computer Opteconoms, Inc., of Annapolis, Maryland. The firm has expertise in contingency planning for oil spills, as well as in response and prevention.

⁵To calculate the size of potential spills, the industry, according to our consultant, assumes that an emergency shut-down valve is located so that a person can reach it within 3 minutes.

Inspection Program's Impact on Oil Spill Reduction Has Not Been Assessed

The Coast Guard vests its program management responsibilities for waterfront facility inspections with local officials. However, we found that neither these officials nor headquarters officials have compiled basic information needed to determine the effectiveness of their inspection efforts. Local officials currently send quarterly reports to headquarters that show the number of inspections completed but do not provide additional details on the deficiencies found or corrective actions taken. Furthermore, there is no process to link information gathered from Coast Guard investigations of the causes of spills to the results of inspections. Linking this information could determine, for example, which types of noncompliance with federal regulations may need greater attention during inspections.

We reviewed facility inspection files at four locations and compiled inspection information that is not being compiled by the Coast Guard, such as the number of deficiencies reported during an inspection. (See app. III for details.) From January 1987 through June 1990, 1,401 inspections had been conducted and a total of 2,892 deficiencies recorded. Inspectors identified 1 to 27 deficiencies in over 58 percent of the inspections, even though Coast Guard inspections were announced and conducted by appointment with facility management. Many types of deficiencies, such as inadequate lighting and untested hoses, were recorded. About 14 percent of the facilities were reinspected when, in the opinion of local Coast Guard officials, deficiencies were serious. Upon reinspection, Coast Guard inspectors documented that about one-half of the deficiencies had been corrected, but records did not indicate whether these corrected deficiencies were the most serious or whether the remaining deficiencies were eventually corrected.

We also reviewed investigation files and compiled information on oil spills for the same 3-1/2-year period at the same ports to determine the extent of the pollution problems at these ports. A total of 1,402 spills had occurred; of these, 51 percent occurred at waterfront facilities inspected by the Coast Guard. (See app. IV for details.) The waterfront facility spills averaged 1,909 gallons, which was slightly less than the overall average of 1,921 gallons; 57 percent of the spills occurred during the transfer of oil between the facility and a vessel.

The Coast Guard has not linked information gathered from these spill investigations with the results of its facility inspections to evaluate the impact inspection efforts may have on reducing oil spills. Although we did not evaluate information on the causes of spills in each case, we

found that conditions for which the Coast Guard inspects, that is, non-compliance with pollution prevention regulations, were the cause of many spills. For example, (1) an 800-gallon spill in New Orleans occurred because a hose, which had not been tested or marked in accordance with Coast Guard regulations, burst while transferring diesel oil under pressure and (2) a 5,000-gallon spill in New York occurred when a tank was overfilled with oil because no employee was present to monitor the transfer, as required by regulations.

We recommended in two previous reports that the Coast Guard needed to develop measures not only to evaluate whether a program is achieving its goals but also to monitor performance and ensure that resources are properly allocated.⁶ The Coast Guard generally agreed with our recommendations and has provided guidance on how such programs should be developed. Until the Coast Guard collects the type of information noted above, in our opinion, it will not be in a position to address a number of issues regarding its program, such as establishing measurable goals and improving its inspection strategy by targeting its resources on areas of greatest pollution risk.

Conclusions

The Coast Guard has implemented a program to regulate and inspect waterfront facilities but is not meeting its full responsibility because it is not inspecting portions of intrafacility pipes that transport oil between docks and tank storage areas. Its field inspectors mistakenly believe that pipes between the first valve ashore and the storage area are not clearly delineated as transportation-related. Coast Guard headquarters officials now acknowledge their responsibility to inspect waterfront facilities, including pipelines leading up to and from storage facilities.

The Coast Guard cannot determine the effectiveness of its inspection program on reducing the risk of oil spills because basic information on the results of the program, such as the types, severity, and frequency of deficiencies found by inspectors, is not compiled and linked with information on the causes of oil spills found by investigators. Until the Coast Guard collects this type of information, it will not be in a position to

⁶Department of Transportation: Enhancing Policy and Program Effectiveness Through Improved Management (GAO/RCED-87-3, Apr. 13, 1987) and Coast Guard: Reorganization Unlikely to Increase Resources or Overall Effectiveness (GAO/RCED-90-132, July 12, 1990).

establish measurable goals or objectives to ensure that its current inspection strategy is making the best use of its resources.

Recommendations to the Secretary of Transportation

We recommend that the Secretary ensure that waterfront facility pipelines transporting oil between the dock and storage tanks are inspected. In addition, we recommend that the Secretary direct the Coast Guard to (1) record and collect information on the results of its inspections, including the type, severity, and frequency of deficiencies found, as well as information from its investigation of spills, such as regulations that have not been complied with, and (2) use this information to set measurable goals, assess inspection program effectiveness, and improve its inspection strategy and resource use.

Scope and Methodology

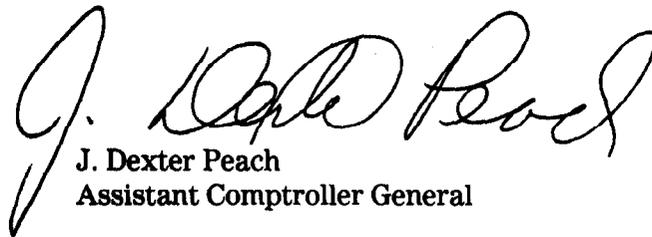
We conducted our work on waterfront facilities primarily from June 1990 through February 1991. We interviewed Coast Guard officials at headquarters and field offices in Chicago, Illinois; New Orleans, Louisiana; New York, New York; and, Philadelphia, Pennsylvania—four ports receiving and distributing significant amounts of oil. During our work we examined (1) the scope of waterfront facility inspections, (2) the inspection program implemented in several ports, and (3) the nature of the water pollution problem in those ports. We supplemented the interviews with a review of Coast Guard records pertaining to inspections of waterfront facilities and pollution incidents. We reviewed all such records made available to us for the 3-1/2-year period from January 1987 through June 1990. While working at each field location, we accompanied Coast Guard inspection personnel to see inspection procedures firsthand. We also contacted headquarters and field officials of EPA to obtain information on its role and inspection program.

As you requested, we did not obtain official agency comments on a draft of this report. We did, however, discuss our report with Coast Guard headquarters and local officials, who generally agreed with our findings and conclusions. We performed our work in accordance with generally accepted government auditing standards.

As arranged with your offices, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days after the date of this letter. At that time, we will send copies to the Secretary

of Transportation, the Commandant of the Coast Guard, the Administrator of EPA, and other interested parties. We will also make copies available to others upon request.

This work was performed under the direction of Kenneth M. Mead, Director, Transportation Issues, who can be reached at (202) 275-1000. Appendix V lists the major contributors to this report.



J. Dexter Peach
Assistant Comptroller General

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Abbreviations

DOT	Department of Transportation
EPA	Environmental Protection Agency
GAO	General Accounting Office

Excerpts From Memorandum of Understanding Between EPA and DOT

In accordance with the Water Quality Improvement Act of 1970 (P.L. 91-224), the President delegated authority for preventing water pollution from facilities involved in transportation to the Department of Transportation (DOT) and from nontransportation-related facilities to the Environmental Protection Agency (EPA). The Secretary of Transportation, in turn, delegated the Department's responsibility to the Coast Guard. A 1971 memorandum of understanding between DOT and EPA further clarified the agencies' responsibilities. The following are excerpts from the memorandum defining the meaning of transportation and non-transportation-related onshore and offshore facilities.

"Non-transportation-related onshore and offshore facilities" means:

. . . (E) Oil refining facilities including all equipment and appurtenances related thereto as well as in-plant processing units, storage units, piping, drainage systems and waste treatment units used in the refining of oil, but excluding any terminal facility, unit or process integrally associated with the handling or transferring of oil in bulk to or from a vessel.

(F) Oil storage facilities including all equipment and appurtenances related thereto as well as fixed bulk plant storage, terminal oil storage facilities, consumer storage, pumps and drainage systems used in the storage of oil, but excluding in-line or break-out storage tanks needed for the continuous operation of a pipeline system and any terminal facility, unit or process integrally associated with the handling or transferring of oil in bulk to or from a vessel.

. . . (K) Pipeline systems which are used for the transport of oil exclusively within the confines of a nontransportation related facility or terminal facility and which are not intended to transport oil in interstate or intrastate commerce, but excluding pipeline systems used to transfer oil in bulk to or from a vessel.

"Transportation-related onshore and offshore facilities" means:

(A) Onshore and offshore terminal facilities including transfer hoses, loading arms and other equipment and appurtenances used for the purpose of handling or transferring oil in bulk to or from a vessel as well as storage tanks and appurtenances for the reception of oily ballast water or tank washings from vessels, but excluding terminal waste treatment facilities and terminal oil storage facilities.

**Appendix I
Excerpts From Memorandum of
Understanding Between EPA and DOT**

(B) Transfer hoses, loading arms and other equipment appurtenant to a nontransportation related facility which is used to transfer oil in bulk to or from a vessel.

(C) Interstate and intrastate onshore and offshore pipeline systems including pumps and appurtenances related thereto as well as in-line or breakout storage tanks needed for the continuous operation of a pipeline system, and pipelines from onshore and offshore oil production facilities, but excluding onshore and offshore piping from wellheads to oil separators and pipelines which are used for the transport of oil exclusively within the confines of a nontransportation related facility or terminal facility and which are not intended to transport oil in interstate or intrastate commerce or to transport oil in bulk to or from a vessel.

Uninspected Pipes at Philadelphia Waterfront Facilities

	Average	Range
Number of pipes	10	1 - 25
Distance not tested (feet)	5,821	300 - 20,970
Diameter of largest pipe not tested (inches)	23	8 - 36
Age of oldest pipe (years)	30	12 - 45
Closest distance to water (feet)	72	7 - 300
Possible gallons lost per minute	10,807	2,772 - 18,900

Coast Guard Inspections of Waterfront Facilities in Four Ports (Jan. 1987 Through June 1990)

	Chicago	New Orleans	New York	Philadelphia	Total
Number of inspections	137	524	574	166	1,401
Number of deficiencies	112	642	1,798	340	2,892
Percent of inspections with deficiencies	39.4	47.3	72.0	60.2	58.2
Percent of deficiencies corrected immediately	13.4	5.3	4.8	0.3	4.7
Percent of facilities reinspected ^a	22.7	9.5	11.3	31.3	14.0
Percent of deficiencies reinspected	20.5	12.3	14.0	32.9	16.1
Percent of deficiencies verified as corrected ^b	20.5	8.7	7.0	5.0	7.6

^aFacilities subject to Coast Guard reinspection were those that had outstanding deficiencies when the inspectors left. The percent of deficiencies reinspected is different from the percent of facilities reinspected because facilities had varying numbers of deficiencies.

^bStatus as determined by reinspection and documentation in Coast Guard facility inspection records. Additional deficiencies may have been reported as corrected by facility operators, but there was no evidence in the inspection record that the Coast Guard had verified the correction.

Oil Spills in Four Ports (Jan. 1987 Through June 1990)

	Chicago	New Orleans	New York	Philadelphia	Total
Number of spills	69	719	376	238	1,402
Total gallons spilled (thousands)	32.3	1,206.9	1,282.9	84.6	2,606.7
Number of spills at waterfront facilities	43	281	231	157	712
Percentage of spills at waterfront facilities	62.3	39.1	61.4	66.0	50.8
Total gallons spilled at waterfront facilities (thousands)	29.0	109.9	1,108.2	70.1	1,317.3
Average number of gallons spilled per incident at waterfront facilities	675	391	5,277	449	1,909
Percent of spills occurring during transfer operations	62.8	57.3	60.6	49.0	56.9

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